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UNITED STATES DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

SERIAL NUMBER: 09/885,642

ART UNIT: 1762

FILING DATE: 06/20/2001

EXAMINER: Erma C. Cameron

APPLICANT: Kelsoe, Darrell W.

DATE OF OFFICE ACTION:

TITLE: Process For Treating Wood and
Products From Treated Wood

DATE OF RESPONSE: ~~11/10/2003~~

NOTICE OF FILING AFFIDAVITS

The Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

COMES NOW, Darrell Kelsoe, by and through the undersigned counsel and submits to the examiner the attached affidavits of Gopal Nair and Hal Potts as well as the exhibit to Hal Potts' affidavit, his test results for the patentability of the invention disclosed in the referenced patent.

These have been previously submitted in the related '165 case. They show both a superior result and a different process than that.

These show that the prior art fails to achieve a self sustaining exothermic reaction, even when modified to be more closely associated with the invention described herein. They show that because of the failure of the prior art to achieve or suggest a similar result that the invention is novel and is non-obvious.

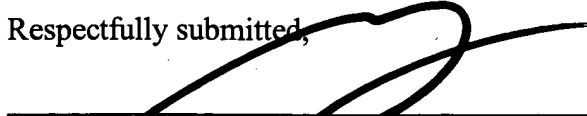
The prior art must, for obviousness, "both suggest the claimed subject matter and reveal a reasonable expectation of success to one reasonably skilled in the art. *In re Vaeck*, 947 F.2d 488, 493; 20 USPQ 2d 1438, 1442 (Fed. Cir. 1991)" *Ex parte Warne* Appeal No. 1997-2509; application no 08/30,982.

Reference is also made to *Ex parte Baker*, Appeal No. 94-3007 application

07/909, 039.

Other authority is available is available on request.

Respectfully submitted,


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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United State Postal Service as Express Mail NO. X366014 US in an envelope addressed to: Commissioner of Patents and Trademarks, Mail Stop Fee Amendment, Alexandra, VA 22313, on the 27 day of January, 2004.


GREGORY M. FRIEDLANDER, 31,511

O I P E
JAN 27 2004
PATENT & TRADEMARK OFFICE

AFFIDAVIT

Dr. Gopal Nair, an individual in residence in Mobile, AL who swears as follows:

1. I am Professor of Biochemistry and Molecular biology at the University of South Alabama College of Medicine, Mobile, Alabama.
A detailed personal background is attached herewith.

In U.S. Patent 5,652,026 to Saka *et al.*, the technology treats wood with a methylsiloxane oligomer which contains phosphorous and/or boron. These are high molecular weight copolymers that need to be prepared separately from trialkoxysilanes and other reagents by heating and diluting. The material to be applied on to wood is not an alkyltrialkoxysilane but a pre-prepared copolymer. Saka does not disclose Applicant's claimed composition.

The wood to be treated by the Saka formula is moisture conditioned first by soxhlet extraction with acetone, a very expensive procedure followed by re-exposure to moisture to the desired water content. This conditioned wood is then dipped for three days in the oligomer formula in methanol under vacuum. Essentially the oligomer is forced to be drawn in to the pores of wood by mechanically applied vacuum and the methanol is simultaneously removed. The wood then undergoes heat treatment at 65 degrees for one day and then at 105 degrees for another day requiring costly fuel expenditure. This wood had a weight gain of 11.3%; however on exposure to water for four hours more than one half of the silicon (7.5%) was leached out indicating that the silicon is not bonded to the wood in spite of prolonged and expensive curing of the wood at high temperatures after treatment.

Saka's technology of using the silicon oligomers followed by curing the wood at high temperatures to obtain fire retardency does not teach the Fossil Rock technology described in the Kelsoe application.

**MECHANISM OF REACTION OF KELSOE'S FORMULATION WITH WOOD vs.
SOL-GEL PROCEDURE OF SAKA:**

Applicant's '642 application is unexpected, new and novel. For example, if one evaluates the make-up of the reacting formula of the sol-gel technology with wood vs. the reacting formula of the '642 application there are no similarities.

Saka's disclosure is a mixture of un-reactive gel comprising of oligomers made soluble in an aqueous medium (SOL-GEL formula).

Saka's treatment is un-reactive on contact with wood.

Saka's disclosed technology is based upon **SOL-GEL** technology. The term **SOL-GEL** refers to:

- 1) Making a gel like substance of undefined chemical composition by hydrolyzing a

mixture of boron, silicon and phosphorous reagents with water. The product thus formed is a mixed oligomer, contained in a reaction vessel outside the vicinity of any wood to be treated.

- 2) The above gel is then made soluble in an aqueous organic solvent. This solution no longer contains or have any similarities with the reagents used as wood treatments in the instant patent.
- 3) The wood to be treated is separately extracted with acetone in a special complex apparatus known as the soxhlet to remove water. The wood is then dried and re-exposed to moisture to get the desired moisture content for the wood to be treated.
- 4) The wood is then placed in a chamber and vacuum is applied for approximately three days to evacuate the wood.
- 5) The evacuated wood while in vacuum is then exposed to the solubilized oligomer gel formula to have the formula enter the wood. The wood is subsequently removed after forced impregnation of the sol-gel under vacuum and then dried at 60 degrees.
- 6) **No reaction has yet taken place among wood molecules and the oligomer formula.**
- 7) The wood is then heated at 105 degrees for another 24 hours to make the reaction work at least partially. Both silicon and boron leaches out of the wood in significant amounts on exposure to water after pyrolysis.
- 8) SOL-GEL stands for Soluble Gel. The composition of the formula consists of oligomers of polysiloxanes prepared from hydrolysable silicon, boron and phosphorous compounds that are treated with water and hydrolyzed to oligomers of unknown composition.
- 9) This mixtures of oligomers are then dissolved in methanol/water to make the formula to treat wood. Saka utilizes a mixture of oligomers in aqueous methanol prepared outside wood prior to treatment. This formula is not related to Applicant's invention.

Saka's oligomers whether outside or inside the wood are unable to react with wood molecules unless activated by heat for prolonged periods (24 hours at 60 degrees and another 24 hours at 105 degrees. In order for the formula to penetrate wood of 1.0 mm thickness(minor compared to any observations of Kelsoe) a vacuum must be applied for three days. In addition the wood piece must be preconditioned with soxhlet extraction and then moisture conditioned. The entire procedure is so cumbersome and expensive that in all probability it will not result in profitable industrial application.

'642 application differs entirely from the above cited documents technology with respect to the composition in the following ways:

Kelsoe composition is chemically well **defined** and identified.

Kelsoe composition does not make use of aqueous solutions, **anhydrous organic solvents** are required for the composition. Kelsoe's composition, in one embodiment, utilizes a **halogenated silane** component as a pro-catalyst. [The concept of pro-catalyst is **novel and unexpected** in wood industry].

Kelsoe's composition enters wood without prior conditioning or application of vacuum for several days.

Kelsoe's composition **instantly reacts with wood hydroxyl groups on contact** and activates the accompanying reagents to form **silicon-oxygen covalent bonds** not only on the surface but also within the wood.

Kelsoe's composition requires no prior drying of wood or no drying of wood after treatment to be effective.

Various Kelsoe's formulations described herein are unique with respect to defined and pure ingredients and the formulas with a pro-catalyst must have a **halogenated silane** and a **non-aqueous** organic solvent to be effective. None of the cited documents describes the use of a halogenated silane as a pro-catalyst to activate additives for instant reaction within the wood with wood molecules to form stable covalent bonds.

For these reasons and others the technology described in the instant application is novel, unprecedented and unexpected from SAKA teachings. The technology described in the Kelsoe application is patentable over the cited but not relied up on prior art documents of Saka and others.

I have reviewed the report from the experiments performed by Potts comparing Saka to Kelsoe. I found these experiments to be completely consistent with my expectations and my experimentation with the Kelsoe formulations which verified the exothermic and spontaneous nature of the invention with the Kelsoe technologies.

Saka teaches the creation of an oligomer and impregnating of wood with a solution of a methylsiloxane oligomer containing phosphorus and/or boron. (see Saka, col. 2, lines 23-52). Saka teaches away from functional disclosure by eliminating the reactive monomers which are used to form the cyclic rings on the matrix defined by the cellulose as shown in the Figures 6a and 6b.

Saka fails to react exothermically for several reasons, one of which being that the oligomers cannot line up with the atoms in the wood easily because of the need to structurally align the oligomer and because the oligomer is non-reactive without heat and pressure.

After creation of the oligomer, Saka engages in a three step process which involves impregnation followed by subsequent hydrolysis or pyrolysis and then a following polycondensation reaction. Saka teaches a preferred embodiment by impregnating wood with a methylsiloxane oligomer containing phosphorus and/or boron and a silicon atom having at least two methyl groups directly attached thereto, subjecting the oligomer within wood cell voids to hydrolysis or pyrolysis and effecting polycondensation, there is formed a phosphorus oxide and/or boron oxide which is chemically trapped in a presumed water repellent methylsilicone resin and a cured product or gel thereof. (see Saka, col.3, lines 20-36).

Because Saka forms oligomers outside of the wood, the practical affect is to stop the spontaneous reaction by trying to force chains, as opposed to individual one reactant trivalent, tetravalent or pentavalent atom molecules, in alignment with the cellulose. By conducting this reaction within the wood, applicant creates his bonding product on a template defined by the wood thereby ensuring alignment of short compounds.

Saka prevents this formation by making the oligomers outside of the wood.

The Kelsoe patent, the initial covalent bonds are theorized to align with the wood cellulose to which they bond.

Saka's recitation of Ain cell walls@ refers to voids in the wood (see Saka, col. 3, lines 20-36). The Saka technology fills the gaps and voids in wood with the disclosed oligomer or oligomer solution, but no reaction occurs with the cellulose upon the filling of the void of the wood. This is evidenced in Saka's disclosure:

"Next, the wood impregnated with the methylsiloxane oligomer and aged is dried at a temperature at which the wood does not undergo pyrolysis, preferably 50 degree to 110 degree C" (see Saka, Col. 5, lines 1-14).

Saka states "wood impregnated with the methylsiloxane oligomer and aged is dried at a temperature at which the wood does not undergo pyrolysis". Thus Saka teaches away from Applicant's invention; and states that no reaction occurs upon impregnation; does not teach an exothermic reaction; and is a different technology than Applicant's claimed invention. Not only does Saka not teach all of the elements of Applicant's claimed invention, but also, Saka's two step process does not teach, motivate, suggest or predict the likelihood of success of Applicant's claimed invention.

Further, and different from Applicant's claims reciting applying said solution to wood cellulose; and pulling solutes with a reaction with water in the wood cellulose to covalently bond, Saka discloses that after impregnation, the oligomer is subject to hydrolysis or pyrolysis, which is then followed by a polycondensation reaction (resulting in curing of the oligomeric treatment).

"As a result, a methyl-silicone resin containing incombustible phosphorus oxide and/or boron oxide is formed in cell walls" (see Saka, col. 2, lines 52-57). Again, Saka's recitation of "in cell walls" refers to voids in the wood (see Saka, col. 3, lines 20-36).

Saka discloses "In the drying step, the oligomer cures through hydrolysis or pyrolysis and subsequent polycondensation, converting into a methylsilicone resin containing phosphorus oxide and/or boron oxide. The hydrolysis step may be promoted by an acidic or basic catalyst, metal organic acid salt or organometallic compound or a mixture of such catalysts. Typically, wood is impregnated with a methylsiloxane oligomer solution, kept therein for about 1 to 7 days under a vacuum of 10 to 15 mm Hg at room temperature, taken out of the solution, allowed to stand at room temperature for about one day, and heat dried at 50 degree to 110 degree C for about 2 to 2 days". (see Saka, Col. 5, lines 1-14). After, and separate from, Saka impregnation of the wood voids, Saka teaches a reaction of hydrolysis or pyrolysis that is followed by a polycondensation reaction. Saka process requires preferably 50 degree to 110 degrees C A (see Saka, Col. 5, lines 1-14). These conditions support the reaction series which occurs separately from and after impregnation.

With regard to Saka's different reaction, the disclosure teaches that whether it is Saka's formula (1) or (2) [(1) $(CH_3SiO_{3/2})_m(MO_{3/2})_n$; (2) $[CH_3SiO_{3/2}]_x[(CH_3)_aSiO_{(4-a)/2}]_y[MO_{3/2}]_z$ (see Saka, col. 2, lines 23-52)], The oligomer is terminated with a hydroxyl group and/or an alkoxy group of 1 to 4 carbon atoms. (see Saka, col. 4, lines 12-19). Saka goes on to teach that preferably the methylsiloxane oligomer has an average degree of polymerization of 2 to 50, preferably 2 to 20 (see Saka, col. 4, lines 20-21). Saka=s Example 1 discloses an average degree of polymerization of about 4 and was terminated with a methoxyl group (see Saka, col. 5, lines 35-36), while Saka=s Examples 2, 3, 4, 5, 6 and 7 recite an average degree of polymerization of about 6 and was terminated with a methoxyl group and a hydroxyl group (see Saka, col. 6, lines 43-44, col. 6, lines 66-67, col. 7, lines 26-27, col. 8, lines 1-2, col. 8, lines 28-29, and col. 8, lines 28-29).

Applicant's reaction employs different reactants and a different mechanism for employing the reactants.

Saka teaches a chemistry in which the reaction does not involve wood cellulose and water as a solvent drawing solutes from the solvent applied to the wood. **Applicant's claimed invention employs a different principle of operation, different chemistry and different process steps from those disclosed by Saka or any of the other cited documents.**

Thus, there is no *prima facia* case of anticipation and no *prima facie* case of obviousness over Saka or any combination of references including Saka. Therefore, withdrawal of rejections under 35 U.S.C. ' 102 and 103 over Saka alone or in a combination including Saka is proper.

No significant instant reaction and covalent bond formation occur with Saka. Instead, the wood undergoes heat treatment at 65 degrees for one day and then at 105 degrees for another day. This wood had a weight gain of 11.3%; however on exposure to water for four hours silicon was leached out indicating that the silicon is not bonded to the wood in spite of prolonged and expensive curing of the wood at high temperatures after treatment. Our experimentation shows

no substantial leaching of reactants following Kelsoe's treatment. Applicant claims an exothermic reaction resulting in covalent bonds. Saka forces the creation of oligomers prior to the application of Saka mixture of the wood. Saka technology does not function in the manner of the invention claimed by Applicant. Applicant's solution is stable and does not involve any reaction prior to application to the wood. Saka's technology of using the silicon oligomers (prepared separately outside the wood) followed by curing the wood at high temperatures to obtain fire retardency is not similar or pertinent to the technology recited in this application.

Saka does not disclose expressly or inherently all of the elements of Applicant's claimed invention. Further, there is no teaching, suggestion or motivation to practice Applicant's claimed invention. Thus, the withdrawal of the instant rejection under 35 U.S.C. 102(b) over Saka is proper and justified.

Saka discloses the beginning with methyl cellulose or oxygenated cellulose or oxygenated boron gels, which are readily dissolvable utilizing organic solvents which can be injected into wood and may react with the wood utilizing high temperature and along with the possible use of acids in order to enhance the reaction.

This process occurs external to the wood and its cellulose which is ultimately treated with the dissolved gel.

The Kelsoe application teaches the use of chemicals which are exposed to the wood and utilizing a catalyst in the form of an acid or a reactant such as a halogenated compound such as methyltrichlorosilane (a pro-catalyst) that reacts with water in the wood and activates the production of an intermediary hydrolyzed silicon additive which in turn instantly reacts with the hydroxyl groups of the cellulose in order to bond the oxygen and silicon atoms to form polymeric chains directly on the wood cellulose (hypothesized).

The dramatic and non-obvious result is that instead of having to utilize energy in order to generate the reaction, the reaction itself is self propagating and will in fact generate a limited controlled heat until the entire wood is treated or until the cellulose or compounds are used up. Solvent concentrations and combinations (specifically claimed) allow control of the reaction to prevent destruction of wood which a different reaction would cause.

Instead of requiring that the oxygenated (hydrolyzed) chemicals be pushed into the wood under pressure and applying vacuum leading to imperfect or irregular saturation, the Kelsoe reaction pulls in the chemicals as fuel for the chemical reaction. This process will allow penetration of reagents at much deeper and more even level.

Hence, one reason for using hydrophilic organic solvents is in order to prevent the hydrolysis of the chemicals until they come in contact with the water within the wood. Hence, while similar individual chemicals may be found in both processes, the utilization of the chemicals is so diametrically opposed as to create the difference between an endothermic and an exothermic chemical reaction, an unexpected result.

Since penetration, even treatment and energy conservation are primary goals in wood treatment, it becomes clear that the current process was not obvious in the disclosures of the cited documents or it would have been disclosed in the manner taught in the present invention.

The use of an exothermic reaction in order to bond silicon and boron to wood cellulose is not disclosed previously.

I am of the opinion that there has been a long felt but unresolved need for a technique for bonding silicone to cellulose in wood of the type taught by Kelsoe in the above referenced application, and to provide for an effective method of treating wood without using pollutants as reflected in the prior art and the articles written to this area of the art.

Applicant's claimed invention does not require "stuffing" pores in the wood of the type required by hydrophobic silicon formulations which are available as emulsions or slurry. The claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and which reacts with wood cellulose. I do believe that none of the cited documents disclose treatments that would form permanent bonding of the interior and surface of the wood (or wood products), spontaneously, by contact.

Applicant's claimed invention is also distinguished by incorporating a soluble boron reagent into the formulas that would react with wood cellulose and lignins in a manner similar to silicon; thus forming a silicon-boron matrix in the wood further contributing to termite protection and fire retardency. The cited prior art infusing unreactive boron acids into the wood without fixing those in the wood using a covalently bonded shield are easily distinguished.

Applicant's solvents are non-reacting.

The procedure described in the Kelsoe patent fulfills a long felt but unresolved need in the area by providing a method allowing for the spontaneous and exothermic (at room temperature and pressure) drawing of reactive solutes from a solution utilizing the water in the wood in order to create an acid that in turn allows the formation of covalent bond formation of silicon on the wood cellulose. The prior art clearly teaches away from this result and does not suggest or anticipate this type of reactant / solution / catalyst or this results from it's application forward.

Finally, I have noted with interest that the Saka experiments were carried out with wood wafers of 1mm thickness that has only laboratory but not any industrial relevance as far as the wood treatment industrial technology is concerned. I request the examiner to consider the fact that Kelso experiments were conducted with wood blocks of at least 1 x 1 inch square blocks and the treatment required only mere exposure of wood with the kelso formula to achieve the recited results without any prior hydrolysis and reformulation of reagents, preconditioning of wood wafers for moisture content, acetone treatment of wood, application of vacuum and heating of treated wood at elevated temperatures twice to attain a level of temporary treatment that is far inferior (leaching out) to the Kelsoe technology.

1. organic solvents defined in the claims as organic solvents allowing the solutes to be drawn from the solvent into the wood. (This involves lowering the water content in the solvent to a level which "allows the solutes to be drawn from the solvent in the wood"),

2. non-oligomerized reactants are taught to the extent the solutes are drawn from solution not oligomers;

3. covalently bonding the solute compound to the hydroxyl groups of the wood cellulose, in an exothermic reaction (initiated at room temperature and standard pressure);

Additionally recited claim elements may include:

4. A reaction initiated without adding heat prior to the hydrolyzing of the pro-catalyst to generate an acid using water in the wood. A lowering of the water level in the solvent to a point where the water in the wood draws in the reactive solutes is also taught clearly as a function initiation in Kelsoe.

5. Alignment of the bonding atoms with the wood cellulose matrix during the bonding process; and

6. the use of catalysts (created in situ using water in the wood cellulose to hydrolyze the pro-catalyst in the solvent) for driving the reaction.

In conclusion, I have the opinion that the process of Kelsoe embodied above does indeed fulfill a long felt but unresolved need and is patentable over the prior art.

Sworn this 22 day of January, 2004, Mobile, AL.

M. Gopal Nair
M. Gopal Nair

MOBILE, ALABAMA

I, the undersigned, a Notary Public in and for said State and County, hereby certify that M. Gopal Nair, whose name is signed to the foregoing document as M. Gopal Nair, an individual, and who is known to me, acknowledged before me on this date that, being informed of the contents of said document, he executed the same voluntarily on the day the same bears date having full authority to do so.

GIVEN under my hand and seal on this the 22 day of January, 2004.

Notary Public

ATTACHMENT

I currently serve as professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine. I am a Senior Scientist and I am also the Director of the drug Development Laboratory at the University of South Alabama, Department of Biochemistry and a Scientist at the Comprehensive Cancer Center at the University of Alabama in Birmingham.

I have served as Chairman of the department of Biochemistry and Molecular Biology of the college of Medicine for two years beginning 1990, and then served as Vice-Chairman through September 2001. I have received numerous Awards from National Cancer Institute, American Cancer Society and American Heart Association for the past two decades to pursue my drug development efforts. I have advised Private corporations, including BioNumerik Pharmaceuticals, Inc. on the procedures of writing Investigational New Drug (IND) applications, FDA regulations, conflict of Interest, compound manufacture and formulations and served as a consultant of a number of private industries. My professional peers are at the highest levels of outstanding and dedicated scientists who are leaders in their respective fields and work at various prestigious Universities in the United States and throughout the world.

I have also served as Major Professor, Mentor, Director and Guide to the Ph.D. students through their career and tenure in my laboratory. Further, I have taught, directed and guided the research of a number of post-doctoral research associates who were hired by me to carry out chemical research in the area of compound synthesis and formulation. I have more than 160 publications. My contributions in compound synthesis and formulations are widely recognized nationally and internationally.

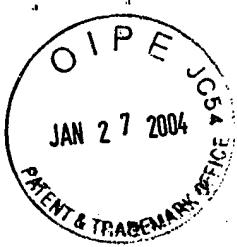
I am Inventor or co-Inventor of several Patents. All of my patents are new inventions developed in my laboratory as potential treatments for human diseases. I have been invited several times by Federal Government Agencies to serve as a member on committees on drug development for cancer, AIDS and other diseases.

I have served Fossil Rock as a paid consultant during the year 2001 and I was personally involved in supervising and studying the properties of the formulations described in the claims in the instant patent application. This expert report is written for a fee on an hourly basis that will be billed to Fossil Rock for payment at a rate of not more than \$200 hr.

I have had extensive practical and theoretical experience with protection and deprotection of amino, hydroxyl and carboxyl groups of complex organic molecules by silylation and in phosphorous chemistry and hydroboration.

This experience is relevant in the analysis of the patentability of the application 09/885,642 because this application deals with silicon and boron chemistry with emphasis placed on the reaction of hydroxyl groups of various wood molecules. Further it deals with the novelty, chemical differences and advantages of the present invention as opposed to the cited, but not relied up on prior art.

I have experience in Patent filing and prosecution in the United States and world-wide. I have personally drafted applications (including claims) for a number of United States and international patent applications. The prosecution of each of my Patent applications resulted in allowable claims and issued Patents. For further details regarding my experience, please see my curriculum vitae which is attached for the Examiner=s convenience.



AFFIDAVIT

Dr. Gopal Nair, an individual in residence in Mobile, AL who swears as follows:

1. I am Professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine.

A detailed personal background is attached.

Claims should not be rejected under 35 U.S.C. 102(b) over Maciejewski.

It is alleged that Maciejewski teaches treating wood with methyltrichlorosilane in an organic solvent such as toluene.

Like Saka, Maciejewski teaches the use of a mixture of methylsiloxane, phenylsiloxane and vinyltrichlorosilane in toluene with subsequent curing to make a coating on metal, concrete or wood. The mechanism of this coating involves co-polymerization of the vinylsilane with the siloxanes on curing on the surface of the metal, concrete or wood. The reagent does not react with the metal, concrete or wood but forms a coating on the surface only.

Toluene disclosed by Maciejewski is a hydrophobic solvent. It repels water and consequently cannot penetrate or allow penetration into the wood unless the wood is dried. As such, the coating occurs only on the surface, whereas Applicant claimed invention claims a hydrophilic organic solvent which contains a claimed compound which reacts with wood.

Applicant further asserts that Maciejewski's expedient of using tri-methylborate (or as cited in paragraphs 10 and 11 trimethylborate or methyltrichlorosilane) to treat wood does not disclose the recitations of Applicant's claims which recite an organic solvent to dilute the reactants which allows the solute to react with "water in the wood cellulose" and to carry out the reaction where the reactants are drawn from the organic solvent to the wood.

The use of straight methyltrichlorosilene or similar reagents would damage the wood due to high levels of undiluted acid production and leave damaging amounts of reagents in contact with the wood or the environment. In contrast, Applicant's claimed invention results in a covalently bonded product, not harmful to the wood, with little or no waste in contact with the wood or environment.

I am of the opinion that there has been a long felt but unresolved need for a technique for bonding silicone to cellulose in wood of the type taught by Kelsoe in the above referenced application, and to provide for an effective method of treating wood without using pollutants as reflected in the prior art and the articles written to this area of the art.

Further, I am of the opinion that current and past silicon - cellulose bonding techniques have been lacking in this area, that is, there has existed a long and unresolved need for a method of obtaining solutes from a solution in order to create non-damaging bonding of silicone to cellulose under acid catalysis or some other comparable technique which has never been filled with any other technology which has been presented up until this point in time.

Applicant's claimed invention does not require "stuffing" of pores in the wood of the type required by hydrophobic silicon formulations which are available as emulsions or slurry. The claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and which reacts with wood cellulose. I agree with the Applicant's assertion that none of the cited documents disclose treatments that would form permanent bonding of the interior and surface of the wood (or wood products), spontaneously, by contact.

Applicant's claimed invention is also distinguished by incorporating a soluble boron reagent into the formulas that would react with wood cellulose and lignins in a manner similar to silicon; thus forming a silicon-boron matrix in the wood further contributing to termite protection and fire retardency. The cited prior art infusing unreactive boron acids into the wood without fixing those in the wood using a covalently bonded shield are easily distinguished.

Applicant's solvents are non-reacting.

Exposure of wood to neat methyltrichlorosilane may be dangerous due to excessive formation of gaseous hydrochloric acid that may hurt handlers and degrades wood. Exposure to neat trimethylborate may result in excessive drawing in of moisture by the treated wood from the environment because of the *hygroscopic conditions that would exist with boric acid*.

Applicant's claimed invention is distinguished over the use of the non-hydrophilic solvents (such as gas and benzene). The cited documents do not disclose Applicant's claimed invention. Such disclosures teach away from Applicant's invention since protection of the wood is the desired end result.

I am of the opinion that the procedure described in the Kelsoe patent fulfills a long felt but unresolved need in the area by providing a method allowing for the spontaneous and exothermic (at room temperature and pressure) drawing of reagents from a solution utilizing the water in the wood in order to create an acid in order to bond silicon to the wood cellulose. The prior art clearly teaches away from this result and does not suggest or anticipate this type of reactant / solution / catalyst or this result from it's application forward.

1. organic solvents defined in the claims as organic solvents allowing the solutes to be drawn from the solvent into the wood. This involves lowering the water content in the solvent to a level which "allows the solutes to be drawn from the solvent in the wood",

2. non-oligomerized reactants are taught to the extent the solutes are drawn from solution not oligomers,

3. covalent bonding the solute compound (silicon) to the hydroxyl groups of the wood cellulose, in an exothermic reaction (initiated at room temperature and standard pressure),

Additionally recited claim elements may include:

4. A reaction initiated without adding heat prior to the hydrolyzing of the pro-catalyst to an acid using water in the wood. A lowering of the water level in the solvent to a point where the water in the wood draws in the solutes is also taught clearly as a function initiation in Kelsoe.
5. Alignment of the bonding atoms with the wood cellulose matrix during the bonding process;
6. the use of catalysts (created in situ using water in the wood cellulose to hydrolyze the pro-catalyst to an acid in the solvent) for driving the reaction.

In conclusion, I have the opinion that the process of Kelsoe embodied above does indeed fulfill a long felt but unresolved need and is patentable over the prior art.

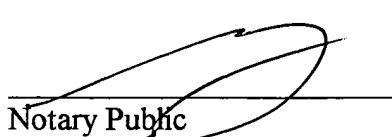
Sworn this 22 day of January, 2004, Mobile, AL.


M. Gopal Nair

MOBILE, ALABAMA

I, the undersigned, a Notary Public in and for said State and County, hereby certify that M. Gopal Nair, whose name is signed to the foregoing document as M. Gopal Nair, an individual, and who is known to me, acknowledged before me on this date that, being informed of the contents of said document, he executed the same voluntarily on the day the same bears date having full authority to do so.

GIVEN under my hand and seal on this the 22 day of January, 2004.


Notary Public

ATTACHMENT

I currently serve as professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine. I am a Senior Scientist and I am also the Director fo the drug Development Laboratory at the University of South Alabama, Department of Biochemistry and a Scientist at the Comprehensive Cancer Center at the University of Alabama in Birmingham.

I have served as Chairman of the department of Biochemistry and Molecular Biology of the college of Medicine for two years beginning 1990, and then served as Vice-Chairman through September 2001. I have received numerous Awards from National Cancer Institute, American Cancer Society and American Heart Association for the past two decades to pursue my drug development efforts. I have advised Private corporations, including BioNumerik Pharmaceuticals, Inc. on the procedures of writing Investigational New Drug (IND) applications, FDA regulations, conflict of Interest, compound manufature and formulations and served as a consultant of a number of private industries. My professional piers are at the highest levels of outstanding and dedicated scientists who are leaders in their respective fields and work at various prestigious Universities in the United States and throughout the world.

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I am Inventor or co-Inventor of several Patents. All of my patents are new inventions developed in my laboratory as potential treatments for human diseases. I have been invited several times by Federal Government Agencies to serve as a member on committees on drug development for cancer, AIDS and other diseases.

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I have had extensive practical and theoretical experience with protection and deprotection of amino, hydroxyl and carboxyl groups of complex organic molecules by silylation and in phosphorous chemistry and hydroboration.

This experience is relevant in the analysis of the patentability of the application 09/885,642 because this application deals with silicon and boron chemistry with emphasis placed on the reaction of hydroxyl groups of various wood molecules. Further it deals with the novelty, chemical differences and advantages of the present invention as opposed to the cited, but not relied up on prior art.

I have experience in Patent filing and prosecution in the United States and world-wide. I have personally drafted applications (including claims) for a number of United States and international patent applications. The prosecution of each of my Patent applications resulted in allowable claims and issued Patents. For further details regarding my experience, please see my curriculum vitae which is attached for the Examiner=s convenience.

O P E
JAN 27 2004

AFFIDAVIT

Dr. Gopal Nair, a individual in residence in Mobile, AL who swears as follows:

1. I am Professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine. A detailed personal background is attached.

Claims have been rejected as allegedly anticipated under 35 USC 102(b) over Nasheri.

The disclosed Nasheri technology is fundamentally different from the exothermic reaction as claimed by Applicant.

As shown in the amended claims and as taught by Nasheri, without a catalyst a (strong acid directly added or made within the wood, or by a strong acid generated upon exposure to water Nasheri does nothing more than put boric acid in the wood. This would be a step which would be done prior to the claimed invention of Applicant if at all.

Nasheri does not disclose the reaction claimed by Applicant. It does not use an activator to activate simultaneously the silicon and boron additive for reaction with the hydroxyl groups of wood molecules. Nasheri does not teach a method of bonding the boron atoms to cellulose and as to one another as claimed by Applicant.

Applicant's claimed invention recites trivalent (such as boron) and tetravalent (such as silicon) reactions, where the claimed atoms are bonded to a halogen atom or bonded to a functional group selected from the group consisting of a hydroxyl group, alkoxy group, etc. Such recitations do not appear to be disclosed by Nasheri.

While Nasheri may add 1% Boron to wood, there is no disclosure of the covalent reaction of boron analogous to the reaction of Applicant's claimed solutions bonded to the claimed functional groups, (or silicon or any other specified atoms) to the wood, or does Nasheri teach covalently bonding to the wood.

Nasheri introduces the boron product through drying the wood so that the wood absorbs the liquid mixture as opposed to the process which is disclosed by Applicant which uses the moisture in the wood to draw a reactive compound out of solution. The exothermic reaction claimed by Applicant is also not disclosed, taught or suggested by Nasheri.

Nasheri technology needs the wood to be dried prior to treatment and does not provide a technology to bond boron to wood that would not leach out. Further, Nasheri technology does not provide a method to simultaneously bond both boron and silicon to wood at points of contact of both dry and wet wood without pre-treatment.

I am completely in agreement with the Applicant's assertion that not all of Applicant's claimed elements are disclosed by Nasheri. Further, the reference teaches away from Applicant claimed invention. Thus, the withdrawal of rejection under 35 U.S.C. 102(b) is proper.

The Nasheri concentrations of boric acid do not make obviousness the process claimed by Applicant, e.g., as discussed above, Applicant asserts that the boron in Nasheri is not covalently bonded to the wood cellulose in the manner claimed by Applicant and to other molecules or compounds as claimed by Applicant. Boric acid is not a strong acid as taught in the claims, showing an acid catalyst

Prior art claims recite that certain additives; e.g., boron (a insect treatment); may be locked into the wood which would increase the percent boron by weight, but not the percent boron reacted by weight as claimed in Kelsoe application.

This highlights a fundamental difference of Applicant's claimed invention which involves the cross linking of molecules across cellulose hydroxyl groups with, for example, boron compounds, not the introduction of an acid into the wood as is the sole outcome of the Nasheri invention. The introduction of boron in this way is considered, but only as a precursor to treatment with the inventive process which would lock these boron compounds into the wood.

Meyers does not remedy the deficiencies of Nasheri..

The '642 and '057 applications provide for a long felt but unresolved need for a technique for bonding silicon to cellulose in wood of the type taught by Kelsoe and teach an effective method of treating wood without using pollutants as reflected in the prior art and the articles written to this area of the art.

Further, I am of the opinion that current and past silicon - cellulose bonding techniques have been lacking in this area, that is, there has existed a long and unresolved need for a method of treating wood by mere exposure of wood to a formula that draws reagents from a solution to wood in order to create non-damaging bonding of silicon using acid catalysis or some other comparable technique which has never been filled with any other technology which has been presented up until this point in time.

Applicant's claimed invention does not require "stuffing" pores in the wood of the type required by hydrophobic silicone formulations that are available as emulsions or slurry. The claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and which reacts with wood cellulose. I fully agree with Applicant's assertion that none of the cited documents disclose treatments that would form permanent bonding of the interior and surface of the wood (or wood products), spontaneously, by contact.

Applicant's claimed invention is also distinguished by incorporating a soluble boron reagent into the formulas that would react with wood cellulose and lignins in a manner similar to silicon; thus forming a silicon-boron matrix in the wood further contributing to termite protection and fire retardency. The cited prior art infusing unreacted boron acids into the wood without fixing those in the wood using a covalently bonded shield are easily distinguished.

Applicant's solvents are non-reacting.

Exposure of wood to neat MTS may be dangerous due to excessive formation of gaseous hydrochloric acid that may hurt handlers and degrades wood. Exposure to neat trimethylborate may result in excessive drawing in of moisture by the treated wood from the environment because of the ***hygroscopic conditions that would exist with the formation of boric acid not bonded to wood cellulose.***

Applicant's claimed invention is distinguished over the use of the non-hydrophilic solvents (such as gas and benzene). The cited documents do not disclose Applicant's claimed invention. Such disclosures teach away from Applicant's invention since protection of the wood is the desired end result.

I am of the opinion that the procedure described in the Kelsoe patent fulfills a long felt but unresolved need in the area by providing a method allowing for the spontaneous and exothermic (at room temperature and pressure) drawing of solutes from a solution utilizing the water in the wood in order to create an acid from a pro-catalyst that facilitates the bonding of silicon and boron to the wood cellulose. The prior art clearly teaches a way from this result and does not suggest or anticipate this type of reactant / solution / catalyst or this result from it's application forward.

1. Organic solvents defined in the claims as organic solvents allowing the solutes to be drawn from the solvent into the wood. This involves lowering the water content in the solvent to a level, which "allows the solutes to be drawn from the solvent in the wood",

2. Non-oligomerized reactants are taught to the extent the reagents are drawn from solution not oligomers,

3. Covalently bonding the reagent atoms (boron and silicon) to the hydroxyl groups of the wood cellulose, in an exothermic reaction (initiated at room temperature and standard pressure),

Additionally recited claim elements may include:

4. A reaction initiated without adding heat prior to the hydrolyzing of the pro-catalyst to an acid using water in the wood. A lowering of the water level in the solvent to a point where the water in the wood draws in the solutes is also taught clearly as a function initiation in Kelsoe.

5. Alignment of the bonding atoms with the wood cellulose matrix during the bonding process;

6. The use of catalysts (created in situ using water in the wood cellulose to hydrolyze the pro-catalyst in the solvent to an acid) for driving the reaction.

In conclusion, I have the opinion that the process of Kelsoe embodied above is new, novel and

unexpected from prior art teachings in addition to fulfilling a long felt but unresolved need and is patentable over the cited prior art.

Sworn this 22 day of January, 2004, Mobile, AL.

M. Gopal Nair
M. Gopal Nair

MOBILE, ALABAMA

I, the undersigned, a Notary Public in and for said State and County, hereby certify that M. Gopal Nair, whose name is signed to the foregoing document as M. Gopal Nair, an individual, and who is known to me, acknowledged before me on this date that, being informed of the contents of said document, he executed the same voluntarily on the day the same bears date having full authority to do so.

GIVEN under my hand and seal on this the 22 day of January, 2004.

Notary Public

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I currently serve as professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine. I am a Senior Scientist and I am also the Director of the drug Development Laboratory at the University of South Alabama, Department of Biochemistry and a Scientist at the Comprehensive Cancer Center at the University of Alabama in Birmingham.

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This experience is relevant in the analysis of the patentability of the application 09/885,642 because this application deals with silicon and boron chemistry with emphasis placed on the reaction of hydroxyl groups of various wood molecules. Further it deals with the novelty, chemical differences and advantages of the present invention as opposed to the cited, but not relied up on prior art.

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personally drafted applications (including claims) for a number of United States and international patent applications. The prosecution of each of my Patent applications resulted in allowable claims and issued Patents. For further details regarding my experience, please see my curriculum vitae which is attached for the Examiner's convenience.



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Claims rejected under 35 U.S.C. 102 as being not patentable over Saka in view of Meyers (US 3,682,675) is also mentioned.

As discussed in my previous affidavits, Saka fails to disclose all of the elements of Applicant's claimed invention. Further, Saka does not teach, motivate or suggest Applicant's claimed invention.

Saka avoids, intentionally, the use of monomers and teaches away from such a use. Saka fails to create a non-water based organic solvent. Saka fails to use acid creating with the use of a neutral pro-catalyst; a drawing of reagents (automatic penetration) into the wood from an appropriate solvent.

Meyers does not remedy the deficiencies of Saka (*see* discussion of Meyers below).

The Nasheri concentrations of boric acid do not make obviousness the process claimed by Applicant, e.g., as discussed above, Applicant rightfully asserts that the boron in Nasheri is not covalently bonded to the wood cellulose in the manner claimed by Applicant and to other molecules or entities of wood as claimed by the Applicant.

Nasheri claims recite that certain additives; e.g., boron (an insect treatment) may be locked into the wood using the claimed invention which would increase the percent boron by weight that would significantly leach out, but not the percent boron reacted by weight as demonstrated in Kelsoe technology.

This highlights a fundamental difference of Applicant's claimed invention, which involves the linking of boron and/or silicon on cellulose hydroxyl groups. This is in sharp contrast to Nareshi teaching of trapping leachable boric acid. The introduction of boron in this way is considered, but only as a precursor to treatment with the inventive process which would only partially lock these boron compounds into the wood.

Meyers does not remedy the deficiencies of Nasheri (*see* discussion of Meyers herein).

The Myers patent relates to the flame retardancy of wood products, and in particular wood panels. Myers disclosed flame retardancy is preferably accomplished by immersing the panel to be treated in a hot solution, and is conducted in the presence of compressional energy (pressure). Myers appears silent with regard to the mechanism by which the treating agent interacts with the wood panel, except that they are infused. Because Myers is relying upon the addition of supplemental heat and pressure. Generally, Meyers does not disclose a reactive event. Infusion is

different from reaction. Thus, specifically, Meyers does not disclose Applicant's claimed reaction. Likewise, Myers also does not disclose the claimed exothermic process of the claimed invention or covalent bonding via the hydroxyl groups of the cellulose.

Applicant claims the use of chemicals to covalently bond boron and/or silicon to the hydroxyl groups of wood cellulose and other hydroxyl group bearing molecules of wood. Applicant teaches a technology that utilizes a neutral pro-catalyst to generate an acid on contact with water or moisture within the wood as the reagents are drawn inside on mere exposure, a process that activates an added boron or silicon additive or both resulting in covalent bond formation; a technology hitherto unknown in the field of wood treatment. For this reason alone, I believe that the applicant's claims should be allowed over the cited up on prior arts.

In addition the technology taught by Kelsoe is an exothermic reaction which is self-sustaining and facilitates deep penetration of the chemicals to the wood without the addition of pressure and heat as is taught by the cited documents. The cited up on prior art also releases toxic and irritating acid fumes to the environment.

There has been a long felt but unresolved need for a technique for bonding silicon and/ or boron to wood molecules of the type taught by Kelsoe in the above referenced application, and to provide for an effective method of treating wood without releasing pollutants as reflected in the prior art and the articles written to this area of the art.

Further, current and past silicon - cellulose bonding techniques have been lacking in this area, that is, there has existed a long and unresolved need for a method of absorbing reagents from a solution in order to create non-damaging bonding of silicon and/or boron using acid catalysis or some other comparable technique which has never been filled with any other technology presented up until this point in time.

Applicant's claimed invention does not require "stuffing" pores in the wood of the type required by hydrophobic silicon formulations which are available as emulsions or slurry. The claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and which reacts with wood cellulose. Applicant, rightfully asserts that none of the cited documents disclose treatments that would form permanent bonding of the interior and surface of the wood (or wood products), spontaneously, by contact.

Applicant's claimed invention is also distinguished by incorporating a soluble boron reagent into the formulas that would react with wood cellulose and lignins in a manner similar to silicon; thus forming a silicon-boron matrix in the wood further contributing to termite protection and fire retardancy. The cited prior art infusing unreacted boron acids into the wood without fixing those in the wood using a covalently bonded shield are easily distinguished.

Applicant's solvents are non-reacting.

Exposure of wood to neat MTS may be dangerous due to excessive formation of gaseous hydrochloric acid that may hurt handlers and degrades wood. Exposure to neat trimethylborate

may result in excessive drawing in of moisture by the treated wood from the environment because of the *hygroscopic conditions that would exist with the accumulation of boric acid*.

Applicant's claimed invention is distinguished over the use of the non-hydrophilic solvents (such as gas and benzene). The cited documents do not disclose Applicant's claimed invention. Such disclosures teach away from Applicant's invention since protection of the wood is the desired end result.

The procedure described in the Kelsoe patent fulfills a long felt but unresolved need in the area by providing a method allowing for the spontaneous and exothermic (at room temperature and pressure) drawing of reagents from his formula. The prior art clearly teaches a way from this result and does not suggest or anticipate this type of reactant / solution / catalyst or this result from it's application forward.

1. Organic solvents defined in the claims as organic solvents allowing the reagents to be drawn with the solvent into the wood. This involves lowering the water content in the solvent to a level that "allows the solutes to be drawn from the solvent in the wood",
2. Non-oligomerized reactants are taught to the extent the pure well defined reagents are drawn from solution; not uncharacterized oligomers,
3. Covalent bonding of boron and /or silicon to the hydroxyl groups of the wood molecules, in an exothermic reaction (initiated at room temperature and standard pressure).

Additionally recited claim elements may include:

4. A reaction initiated without adding heat prior to the hydrolyzing of the neutral pro-catalyst to an acid catalyst using water in the wood. A lowering of the water level in the solvent to a point where the water in the wood draws in the solutes is also taught clearly as a function initiation in Kelsoe.
5. Alignment of the bonding atoms with the wood cellulose matrix during the bonding process;
6. The use of catalysts (created in situ using water in the wood cellulose to hydrolyze the pro-catalyst to an acid) for driving the reaction.

In conclusion, the process of Kelsoe embodied above does indeed fulfill a long felt but unresolved need and is patentable over the prior art.

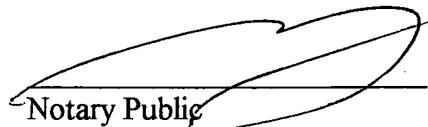
Sworn this 22 day of January, 2004, Mobile, AL.

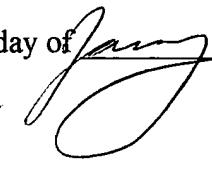

M. Gopal Nair

MOBILE, ALABAMA

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I have had extensive practical and theoretical experience with protection and deprotection of amino, hydroxyl and carboxyl groups of complex organic molecules by silylation and in phosphorous chemistry and hydroboration.

This experience is relevant in the analysis of the patentability of the application 09/885,642 because this application deals with silicon and boron chemistry with emphasis placed on the reaction of hydroxyl groups of various wood molecules. Further it deals with the novelty, chemical differences and advantages of the present invention as opposed to the cited, but not relied up on prior art.

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In case number 10/274,057, the examiner cited additional authority relevant to this patent application for discussion purposes in the form of Liu et al., Chinese Journal of Polymer Science, 18(2), pages 161 B168, 2000.

The Liu document does not involve the treatment of wood. Liu discloses treatment of purified cellulose. Kelsoe's process does not have a prior requirement of preparation to make a homogenous solution to treat with a saline agent.

This is just one method of derivatizing hydroxyl groups in cellulose, a common laboratory procedure. Liu does not teach in order to have a reaction where liquids in the wood draw reactants into the wood from the solution since there is no wood, just pure cellulose in a dish.

The dissolution of and purification of cellulose and the treatment of the resulting silanes under heat and pressure which is discussed in Liu, a temperature between 100 and 120 degrees using lithium chloride, has almost nothing to do with the solvent and catalyst water driven reaction which is discussed in the patent. Liu is irrelevant and in no way being suggested to be combined with the wood treatment technology which is otherwise cited.

If anything, the failure of Liu to take the inventive step of specific solvents with the other chemicals could be applied to raw wood in order to make a reaction involving the release of heat and the drawing of reactants from the carrier solvent into the wood using the water in the wood is indicative that Liu has nothing to do with the invention herein.

This expert, respectfully requests the examiner to consider the fact that the laboratory procedure described by Liu is not relevant to the present invention of industrial and commercial wood treatment procedures of Kelsoe and therefore lacks merit as prior art.

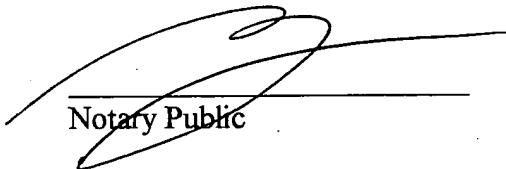
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JAN 27 2004
PARENT & TRADEMARKS

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Claims have been rejected under 35 U.S.C. 102(b) as allegedly anticipated by the study described in the Stabnikov publication.

Applicant's claimed solution is hydrophilic and the reagents are drawn in to the interior of wood and treats all parts of wood.

The formula used by Stabinikov for (Water-repellency treatment) lumber is different from Applicant's claimed invention. For example Stabnikov discloses:

A single reagent, methyltrichlorosilane in gasoline.

Gasoline is a solvent that is hydrophobic, and gasoline is repelled from wood containing moisture and therefore cannot penetrate normal wet wood at standard temperature and atmospheric pressure unless the wood is pre-treated for dryness. This water repellency of gasoline is well documented in various chemical literatures.

The Stabinikov formula does not provide for preservation of wood containing moisture. Stabnikov concludes that the results are not complete and does not affirm that the given problem has been resolved.

Applicant's claimed invention comprises a stable mixture of an activator (a pro-catalyst), a silicon reagent and a boron reagent in a hydrophilic organic solvent that is not repelled by wood moisture. Stabnikov disclosed formula which treats wood, if at all, only on the exterior due to hydrophobicity of the gasoline based formula.

There are differences in the chemical composition of Applicant's claimed formula and the claimed mechanism of treatment. Further, the cited document is not conclusive and teaches away from Applicant's claimed invention by not providing a formula which has reagents drawn from the solution by the water in the wood.

Neither Stabnikov nor Nasheri disclose all of Applicant's claimed elements. Combination of these documents does not disclose claim recitations such as covalent bonding of boron or silicon by an exothermic reaction. As discussed above, in addition to the deficiencies in the cited disclosures, these references also teach away from Applicant's claimed invention and do not predict any likelihood of success.

I am of the opinion that there has been a long felt but unresolved need for a technique for bonding silicone to cellulose in wood of the type taught by Kelsoe in the '642 and '057 applications, and to provide for an effective method of treating wood without using or generating pollutants as reflected in

the prior art and the articles written to this area of the art.

The Kelsoe invention provides:

1. Organic solvents defined in the claims as organic solvents allowing the solutes to be drawn from the solvent into the wood. This involves lowering the water content in the solvent to a level, which "allows the solutes to be drawn from the solvent into the wood",
2. Non-oligomerized reactants are taught to the extent the solutes are drawn from solution not oligomers,
3. Covalently bonding the solute compound to the hydroxyl groups of the wood cellulose, in an exothermic reaction (initiated at room temperature and standard pressure),

Additionally recited claim elements may include:

4. A reaction initiated without adding heat prior to the hydrolyzing of the pro-catalyst to an acid using water in the wood. A lowering of the water level in the solvent to a point where the water in the wood draws in the solutes is also taught clearly as a function initiation in Kelsoe.
5. Alignment of the bonding atoms with the wood cellulose matrix during a bonding process in raw wood and;
6. The use of catalysts (created *in situ* using water in the wood to hydrolyze the pro-catalyst in the formula) for driving the reaction.

Further, I am of the opinion that current and past silicon - cellulose bonding techniques have been lacking in this area, that is, there has existed a long and unresolved need for a method of obtaining solutes from a solution to create non-damaging bonding of silicon and boron using acid catalysis or some other comparable technique which has never been filled with any other technology which has been presented up until this point in time.

Applicant's claimed invention does not require "stuffing" pores in the wood of the type required by hydrophobic silicon formulations, which are available as emulsions or slurry. The claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and which reacts with wood cellulose. Applicant asserts, and I am in agreement, that none of the cited documents disclose treatments that would form permanent bonding of silicon and/or boron in the interior and to the surface of the wood (or wood products), spontaneously, by contact.

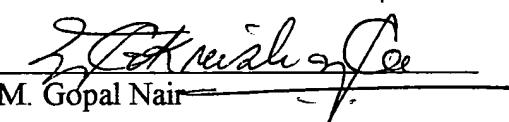
Exposure of wood to neat MTS may be dangerous due to excessive formation of gaseous hydrochloric acid (hydrogen chloride) that may hurt handlers and also significantly degrade wood that undercuts the purpose of the treatment. Exposure to neat trimethylborate may result in excessive drawing in of moisture by the treated wood from the environment because of the *hygroscopic conditions that would exist with the presence of boric acid*.

Applicant's claimed invention is distinguished over the use of the non-hydrophilic solvents (such as gas and benzene). The cited documents do not disclose Applicant's claimed invention. Such disclosures teach away from Applicant's invention since protection of the wood is the desired end result.

I am of the opinion that the procedure described in the Kelsoe patent fulfills a long felt but unresolved need in the area by providing at room temperature a method allowing for the spontaneous and exothermic (at room temperature and pressure) drawing of solutes from a solution utilizing the water in the wood in order to create an acid to bond silicon and/or boron to the wood cellulose via the oxygen atom of the hydroxyl groups. The prior art clearly teaches a way from this result and does not suggest or anticipate this type of reactant / solution / catalyst or this result from it's application forward.

In conclusion, I am of the opinion that the process of Kelsoe embodied above is novel and unexpected and it fulfills a long felt but unresolved environment friendly commercial need of wood treatment that is patentable over the prior art.

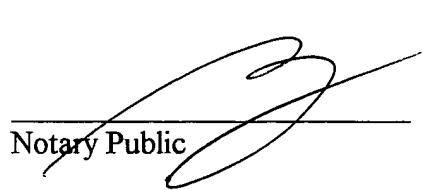
Sworn this 22 day of January, 2004, Mobile, AL.


M. Gopal Nair

MOBILE, ALABAMA.

I, the undersigned, a Notary Public in and for said State and County, hereby certify that M. Gopal Nair, whose name is signed to the foregoing document as M. Gopal Nair, an individual, and who is known to me, acknowledged before me on this date that, being informed of the contents of said document, he executed the same voluntarily on the day the same bears date having full authority to do so.

GIVEN under my hand and seal on this the 22 day of January, 2004.


Notary Public

ATTACHMENT

I currently serve as professor of Biochemistry and Molecular Biology at the University of South Alabama College of Medicine. I am a Senior Scientist and I am also the Director fo the drug Development Laboratory at the University of South Alabama, Department of Biochemistry and a Scientist at the Comprehensive Cancer Center at the University of Alabama in Birmingham.

I have served as Chairman of the department of Biochemistry and Molecular Biology of the college of Medicine for two years beginning 1990, and then served as Vice-Chairman through September 2001. I have received numerous Awards from National Cancer Institute, American Cancer Society and American Heart Association for the past two decades to pursue my drug development efforts. I have advised Private corporations, including BioNumerik Pharmaceuticals, Inc. on the procedures of writing Investigational New Drug (IND) applications, FDA regulations, conflict of Interest, compound manufacture and formulations and served as a consultant of a number of private industries. My professional piers are at the highest levels of outstanding and dedicated scientists who are leaders in their respective fields and work at various prestigious Universities in the United States and throughout the world.

I have also served as Major Professor, Mentor, Director and Guide to the Ph.D. students through their career and tenure in my laboratory. Further, I have taught, directed and guided the research of a number fo post-doctoral research associates who were hired by me to carry out chemical research in the area of compound synthesis and formulation. I have more than 160 publications. My contributions in compound synthesis and formulations are widely recognized nationally and internationally.

I am Inventor or co-Inventor of several Patents. All of my patents are new inventions developed in my laboratory as potential treatments for human diseases. I have been invited several times by Federal Government Agencies to serve as a member on committees on drug development for cancer, AIDS and other diseases.

I have served Fossil Rock as a paid consultant during the year 2001 and I was personally involved in supervising and studying the properties of the formulations described in the claims in the instant patent application. This expert report is written for a fee on an hourly basis that will be billed to Fossil Rock for payment at a rate of not more than \$200 hr.

I have had extensive practical and theoretical experience with protection and deprotection of amino, hydroxyl and carboxyl groups of complex organic molecules by silylation and in phosphorous chemistry and hydroboration.

This experience is relevant in the analysis of the patentability of the application 09/885,642 because this application deals with silicon and boron chemistry with emphasis placed on the reaction of hydroxyl groups of various wood molecules. Further it deals with the novelty, chemical differences and advantages of the present invention as opposed to the cited, but not relied up on prior art.

I have experience in Patent filing and prosecution in the United States and

world-wide. I have personally drafted applications (including claims) for a number of United States and international patent applications. The prosecution of each of my Patent applications resulted in allowable claims and issued Patents. For further details regarding my experience, please see my curriculum vitae which is attached for the Examiner's convenience.